



HELP Math U.S. Department of Education Findings - Summary

HELP Math Overview

HELP Math is the only proven, supplementary web-based program designed to increase student achievement in mathematics, while simultaneously, improving student's overall English literacy and language abilities. HELP targets the continuum of elementary and middle school students (grades 3-8), who may be at risk of failing grade-level subjects (math and science) because they may be missing essential prior knowledge or the relevant vocabulary to understand the content.

HELP engages students through interactive multimedia lessons that break down mathematical terms and concepts so that English language learners can understand the academic subject matter. Math content is presented through synchronized audio, visual, text, and interactivity to create a visual connection between words and meaning. Both grade level and prior grade content is always easily accessible. The program is comprehensive; with over 200 hours of state and national standards-aligned math content and comprehensive foundational lessons and tools to individualize and customize lessons and curriculum.

About the HELP Math Research Study

As part of a multi-million U.S. Department of Education *Ready to Teach* grant, the University of Colorado at Colorado Springs has undertaken a large-scale, multi-year experimental study involving more than 1,200 students nationwide. Dr. Lindy Crawford, Associate Dean of the College of Education, is Chief Researcher of the grant which is in its fourth and final year. The two figures below show the student demographics by ELL condition and state.

Figure 1:

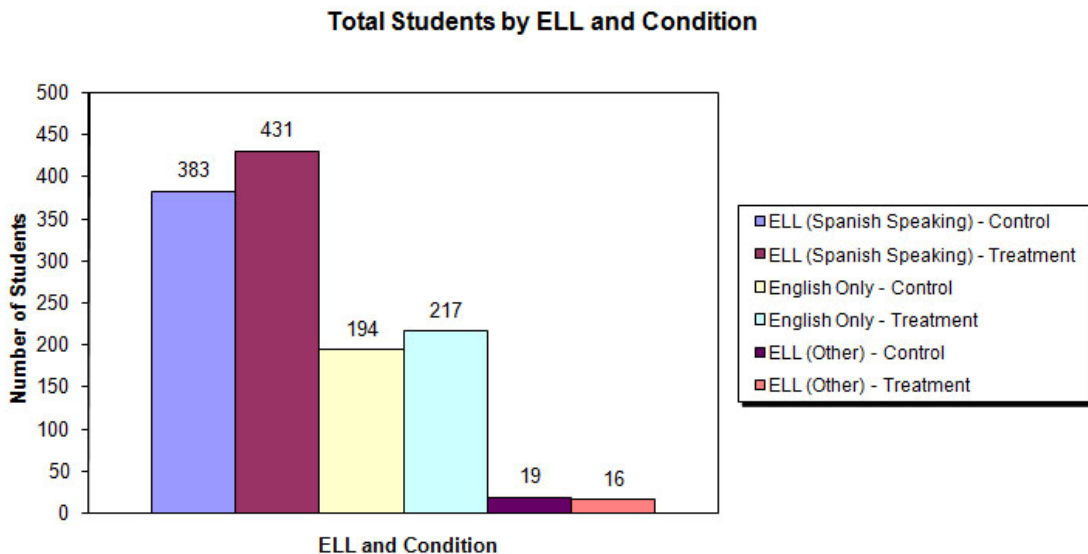
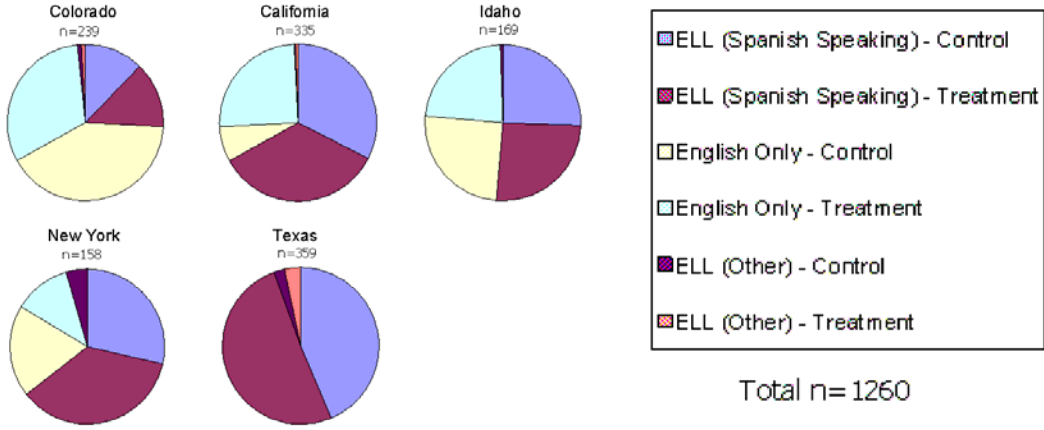




Figure 2:

Number of Students per State by English Language Learner Grouping



University of Colorado created a pre/post-test covering: Numbers and Operations, Algebra, Geometry, and Statistics, as well as a Basic Skills module. Reliable and valid tests targeted for use by middle school, Spanish speaking English language learners were developed and piloted in the summer preceding the 2007 academic year. Assessment design rigorously adhered to guidelines which aimed to make the test as fair and equitable as possible for all test-takers. The test was designed in four phases: item development, pilot test, post pilot edits and creation of content subsets and basic skills subset. Table 1 shows the results of the final item analysis by subtest using item difficulty, point biserial, and a discrimination index. The research team was pleased with the strength of the item statistics and the normalcy of the subtest distributions, especially considering the number of ELLs in the pretest score population.

Table 1: Item Analysis by Subtest

Item Analysis by Subtest				
		Difficulty	Point Biserial	Discrimination Index
Basic Skills	1	.62	0.39	.65
	2	.70	0.35	.54
	3	.41	0.37	.74
	4	.41	0.44	.83
	5	.45	0.25	.59
	6	.52	0.43	.72
	7	.35	0.22	.61
	8	.42	0.29	.64
Numbers Make Sense	9	.48	0.41	.74
	10	.58	0.4	.69
	11	.37	0.16	.51
	12	.18	0.04	.30
	13	.27	0.11	.49
	14	.31	0.11	.50
	15	.78	0.17	.30



	16	.28	0.11	.50
Algebra	17	.38	0.13	.47
	18	.37	0.14	.57
	19	.30	0.19	.55
	20	.23	0.07	.36
	21	.30	0.33	.75
	22	.61	0.36	.60
	23	.33	0.41	.83
	24	.49	0.36	.72
Geometry	25	.47	0.17	.49
	26	.62	0.29	.55
	27	.44	0.32	.69
	28	.50	0.31	.64
	29	.32	0.27	.69
	30	.43	0.41	.81
	31	.32	0.23	.68
	32	.33	0.3	.75
Statistics	33	.22	0.22	.63
	34	.34	0.31	.69
	35	.38	0.34	.76
	36	.26	0.16	.56
	37	.42	0.18	.48
	38	.24	0.17	.65
	39	.40	0.29	.76
	40		0.07	.44

Following the edits to the pilot test, the next task was to implement the large scale student study. The team pre-tested students in seventh and eighth grades in schools located in five states as shown in Figures 1 and 2 above. The pre-test was to be taken prior to starting the *HELP* Math Program study, while the post-test was to be taken following the completion of 25 hours on the *HELP* Math Program.

HELP Shown to Increase Student Math Achievement

HELP Math has shown that students made statistically significant achievement gains on pre-post assessments.

Table 2: Pre-Post Differences

Variable	N	Mean Difference	SEM	t-test	p
Pre- and Post Test Scores	200	1.89	.396	4.78	.00

Dr. Crawford’s team’s analysis also shows that **the HELP Math intervention resulted in greater mean gains than the control group’s well-established supplemental math**



program (e.g., Pearson’s Success Maker) despite the fact that HELP was still in a formative stage of development at the point of testing and Statistics/Data Analysis lessons and Foundational content were still not completed. Moreover, descriptive statistics revealed that the control group received 1.5 more hours of instruction on average than the HELP Math group.

Table 3: Descriptive Statistics for Treatment Group

Variable	N	Min.	Max.	Mean	SD
Total Minutes	90	769	2034	1335.0	337.0
Pre-Test Score	90	5	33	17.5	6.6
Post-Test Score	90	7	35	20.0	7.7

Table 4: Descriptive Statistics for Control Group

Variable	N	Min.	Max.	Mean	SD
Total Minutes	110	575	1865	1476.0	146.0
Pre-Test Score	110	6	30	16.5	6.0
Post-Test Score	110	6	36	17.9	7.4

In addition to student achievement gains, HELP Math is showing other significant benefits:

- Calculations of AYP (adequate yearly progress) indicate an increase of 18% in the AYP in math for LEP/ELL students at the participating schools (Lawyer-Brook, 2008).
- All ELL students who used HELP Math showed increases in their state English language proficiency test from the previous year in the research schools in which data were available (Lawyer-Brook, 2008).
- Field-testing led the research team to believe that HELP Math also had potential for students with disabilities as teachers were reporting its effectiveness with this population. Therefore, in year two of the experimental study, Dr. Crawford’s team asked special education teachers to randomly assign students into control and treatment groups. The final database included 69 students with disabilities. Pre-post mathematics scores of Special Ed students showed 15% gains with HELP (Crawford, 2008).
- For the third consecutive year, HELP Math was reviewed and “deemed to be of high quality” by the U.S. Department of Education’s Government Performance and Results (GPRA) Act (2007, 2008, 2009). The Independent Review Panel of qualified experts, chosen by the US DOE’s Office of Innovation and Improvement, gave the HELP Program a score of 92.33 out of a possible 100; receiving the highest rating available.
- Teacher feedback on the program and training (from surveys and focus groups) has been extremely positive. Quantitative and qualitative information from field studies has informed program modifications; with a strong focus on the needs of



teachers and the factors involved in successful implementation, and sustainable use of a technology-based math intervention (Crawford et al., 2008).